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January 13, 2003

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APPLICATION NUMBER: 60/425,848

FILING DATE: November 12, 2002

PRIORITY DOCUMENT

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11-18-02 60425848 1111402 A/PROV

1133 U.S. PTO

60/425848

PROVISIONAL APPLICATION COVER SHEET

This is a request for filing a PROVISIONAL APPLICATION under 37 CFR 1.53(b)(2).

| | | | |
|--|--|--|---|
| Docket Number US020443P | | Type a plus sign (+) inside this box <input type="checkbox"/> | + |
| INVENTOR(s) / APPLICANT(s) | | | |
| LAST NAME | FIRST NAME | MIDDLE INITIAL | RESIDENCE (CITY AND EITHER STATE OR FOREIGN COUNTRY) |
| Sato Toguchi | Takashi Kazunobu | | Scarborough, New York New York, New York |
| TITLE OF THE INVENTION (280 characters max) | | | |
| A Method for Efficient TIMEOUT Message Management | | | |
| CORRESPONDENCE ADDRESS | | | |
| Corporate Patent Counsel U.S. Philips Corporation 580 White Plains Road Tarrytown, NY 10591 | | | |
| STATE | New York | ZIP CODE | 10591 COUNTRY U.S.A. |
| ENCLOSED APPLICATION PARTS (check all that apply) | | | |
| <input checked="" type="checkbox"/> | Specification Number of Pages | 4 | <input type="checkbox"/> Small Entity Statement |
| <input type="checkbox"/> | Drawing(s) Number of Sheets | 0 | <input type="checkbox"/> Other (specify) |
| METHOD OF PAYMENT (check one) | | | |
| <input type="checkbox"/> | A check or money order is enclosed to cover the Provisional filing fees | | PROVISIONAL FILING FEE AMOUNT (\$) |
| <input checked="" type="checkbox"/> | Commissioner is hereby authorized to charge filing fees and credit Deposit Account Number: 14-1270 | | \$160.00 |

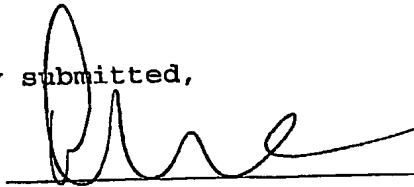
The invention was made by an agency of the United States Government or under a contract with an agency of the United States Government.

☒ No

☐ Yes, the name of the U.S. Government agency and the Government contract number are:

Respectfully submitted,

SIGNATURE:



Date:

11/14/02

TYPED OR PRINTED NAME: DANIEL J. PIOTROWSKI
REGISTRATION NO.: 42,079

☐ Additional inventors are being named on separately numbered sheets attached hereto

CERTIFICATE OF EXPRESS MAILING

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Date of Deposit November 12, 2002

I hereby certify that this paper and/or fee is being deposited with the United States Postal Service "Express Mail Post Office to Addressee" service under 37 C.F.R. 1.10 on the date indicated above and is addressed to the Commissioner of Patents and Trademarks, Washington, D.C. 20231.

Noemi Chapa
Typed Name

Noemi Chapa
Signature

3. GOVERNMENT CONTRACT INVENTION

60425848 . 11.1202

Was the invention made under a government contract?

☐ Yes

☒ No

4. PLEASE PROVIDE A TWO OR THREE SENTENCE SUMMARY OF YOUR INVENTION and include and underline KEY WORDS which might be useful in searching for relevant patents or publications:

By storing remote timeout information when a TIMEOUT message passes through the bridge for the first time, and using the stored information to synthesize a TIMEOUT response message for successive TIMEOUT request messages, eliminate the need to forward TIMEOUT request messages further, and reduce the message traffic and improve the efficiency of the net. Other key words: 1394, 1394.1, Bridging.

5. PRESENT STATE OF THE ART

Briefly describe the closest already-known technology that relates to the invention. This would include, for example, already existing products, methods or compositions which are known to you personally or through descriptions in publications.

This invention addresses the same problem described in the disclosure "An efficient TIMEOUT message management in IEEE 1394 bridge environment" by Toguchi and Sato, which was filed on January 17, 2001. According to the draft standard IEEE P1394.1 Draft 1.0, the TIMEOUT message needs to be processed by each bridge along the way from the source bus to the destination bus to accumulate the timeout value each time the TIMEOUT request message is initiated.

The previous disclosure "An efficient TIMEOUT ..." provides a means to improve the efficiency of this TIMEOUT message management by the following method. 1) The entry portal on the source bus intercepts the initial TIMEOUT response message for a particular destination bus and stores its timeout value. 2) For successive TIMEOUT request messages for the same destination bus, the entry portal on the source bus (or an intermediate bus) synthesizes the corresponding TIMEOUT response message using the stored remote timeout value without further forwarding the TIMEOUT request message toward the destination bus, thus reducing the traffic on the net.

6. ADVANCEMENT IN STATE OF THE ART

Briefly describe the unique advancement achieved by the invention. This may be done, for example, by describing a problem with the prior art that is solved or specific objects that are achieved by the invention.

Problem:

The previous invention allows storing of TIMEOUT values only at the entry portal on the source bus. For instance, even if there are ten bridges between the source bus and the destination bus, only up to one bridge (on the source bus) can store the timeout value for future use.

Advancements:

This invention allows all bridges along the way between the source bus and the destination bus to store the timeout value to the destination bus from its local bus in one shot. For instance, there are ten bridges between the source bus and the destination bus, up to ten bridges can store the appropriate timeout value for a single TIMEOUT message for future use. This method is far

more efficient than the previous invention.

WHAT IS THE BEST WAY YOU KNOW OF TO IMPLEMENT THE INVENTION?

Briefly describe the invention and how it achieves the advancement described in paragraph 7.

A1) When an entry portal receives a TIMEOUT request message, it checks its storage (e.g., the valid_flag for the destination bus) whether the remote_timeout value from its local bus to the destination bus is already known.

In the case that the entry portal's co-portal is the exit portal on the destination bus, it shall know the remote_timeout, max_remote_payload, and hop_count values for the destination bus. For instance, the remote_timeout value is the sum of the SPLIT_TIMEOUT register value of its co-portal and the bridge's internal maximum forwarding time for both request and response subactions. The max_remote_payload value is the maximum payload size that can go through the bridge, and the hop_count value is always one in this case. All these values can be pre-stored by the entry portal together with the valid_flag for the destination bus set to one.

A2) If the remote_timeout value is already known (e.g., valid_flag = 1), it synthesizes a TIMEOUT response message by adding the known remote_timeout value from its local bus to the destination bus to the remote_timeout value in the TIMEOUT request message. It also compares the known max_remote_payload value for the destination from its local bus with the max_remote_payload value in the request message, and uses the smaller of the two as the max_remote_payload value of the response message. It also adds the known hop_count to the destination bus from its local bus to the hop_count value in the request message and uses the sum as the hop_count value in the response message.

Otherwise (e.g., valid_flag = 0), it will perform the following procedure:

A3a) temporarily store (To, Po, Co) for the destination bus with the valid_flag cleared

where To is the remote_timeout value, Po is the max_remote_payload value, and Co is the hop_count value; all in the received TIMEOUT request message.

A3b) forward (To+Tx, Px, Co + 1) toward the destination bus

where Tx is the sum of the maximum forward time for request subactions (from the entry portal to the entry portal of the next bridge) and the maximum forward time for response subactions (from its co-portal (i.e., the entry portal for response subactions) to either the entry portal of the next bridge (from the perspective of response subactions) or the requester node),

and Px is the maximum data payload that can be forwarded from the entry portal to the entry portal of the next bridge

A3c) intercept the corresponding TIMEOUT response message and store (Ty - To, Py, Cy - Co) for future use with the valid_flag set, and forward (Ty, min(Py, Po), Cy) toward the source bus

where Ty is the remote_timeout value, Py is the max_remote_payload value, Cy is the hop_count value; all in the received TIMEOUT response message.

Alternatively, following procedure can be used to produce the same result: 111202

B1) same as A1)

B2) same as A2)

B3a) same as A3a)

B3b) forward ($To + Tx$, $0xFFFF$, $Co + 1$) where $0xFFFF$ is the maximum value for the `max_remote_payload` field

B3c) store ($Ty - To$, $\min(Py, Px)$, $Cy - Co$) with the `valid_flag` set, and forward (Ty , $\min(Py, Px)$, Po , Cy)

The above-discussed procedures provide significant efficiency improvement over the previous invention without requiring changes to the draft standard. This scheme works even if there are both legacy bridges (i.e., bridges based on the draft standard) and these enhanced bridges mixed on the net.

However, further improvement and simplification are possible if changes to the draft standard are allowed and all the bridges follow the same rules as described below:

C1) Each entry portal checks the destination of a received `TIMEOUT` request message and see whether the `remote_timeout` value for the destination is already known by looking at its storage (e.g, the `valid_flag` for the destination bus).

In the case that the entry portal's co-portal is the exit portal on the destination bus, it shall know the `remote_timeout`, `max_remote_payload`, and `hop_count` values for the destination bus. For instance, the `remote_timeout` value is the sum of the `SPLIT_TIMEOUT` register value of its co-portal and the bridge's internal maximum forwarding time for both request and response subactions. The `max_remote_payload` value is the maximum payload size that can go through the bridge, and the `hop_count` value is always one in this case. All these values can be pre-stored by the entry portal together with the `valid_flag` for the destination bus set to one.

C2) If it is known (e.g., `valid_flag = 1`), it generates the corresponding `TIMEOUT` response message by inserting the stored `remote_timeout`, `max_remote_payload`, and `hop_count` values.

C3a) Otherwise (e.g., `valid_flag = 0`), it forwards the `TIMEOUT` request message toward the destination without modifying the message. The value of each field in the message shall be (0, $0xFFFF$, 0) as initialized by the requester by definition.

C3b) If an exit portal (from the perspective of response subactions) receives a `TIMEOUT` response message, it updates the `remote_timeout`, `max_remote_payload`, and `hop_count` values according to the formulas below, stores them for the destination bus for future use with the `valid_flag` set, and forwards the response message toward the source bus:

Store ($Ty + Tx$, $\min(Py, Px)$, $Cy + 1$) with the `valid_flag` set, and forward ($Ty + Tx$, $\min(Py, Px)$, $Cy + 1$)

where Tx and Px are defined in A3b) and Ty , Py , and Cy are `remote_timeout`, `max_remote_payload`, and `hop_count` values in the received `TIMEOUT` response message.

For all of the above-discussed procedures, a table with entries each consisting of `remote_timeout`

field, max_remote_payload field, hop_count field and valid_flag can be used to store both temporary and final remote timeout parameters for each destination bus. The table entries shall be cleared upon net-topology change.

The last method discussed is the simplest and the most efficient solution, and will be proposed to the IEEE P1394.1 working group or BRC (Ballot Response Committee) to be incorporated into the IEEE 1394.1 standard.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of

Atty. Docket/

TAKASI SATO ET AL

US020443P

Serial No.

Filed: CONCURRENTLY

Title: A METHOD FOR EFFICIENT TIMEOUT MESSAGE MANAGEMENT

Commissioner for Patents Washington, D.C. 20231

APPOINTMENT OF ASSOCIATES

Sir:

The undersigned Attorney of Record hereby revokes all prior appointments (if any) of Associate Attorney(s) or Agent(s) in the above-captioned case and appoints:

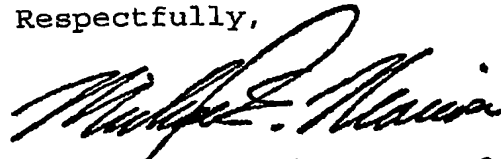
DANIEL J. PIOTROWSKI

(Registration No. 42,079)

c/o U.S. PHILIPS CORPORATION, Intellectual Property Department, 580 White Plains Road, Tarrytown, New York 10591, his Associate Attorney(s)/Agent(s) with all the usual powers to prosecute the above-identified application and any division or continuation thereof, to make alterations and amendments therein, and to transact all business in the Patent and Trademark Office connected therewith.

ALL CORRESPONDENCE CONCERNING THIS APPLICATION AND THE LETTERS PATENT WHEN GRANTED SHOULD BE ADDRESSED TO THE UNDERSIGNED ATTORNEY OF RECORD.

Respectfully,



Michael E. Marion, Reg. 32,266
Attorney of Record

Dated at Tarrytown, New York
this 12th day of November, 2002.